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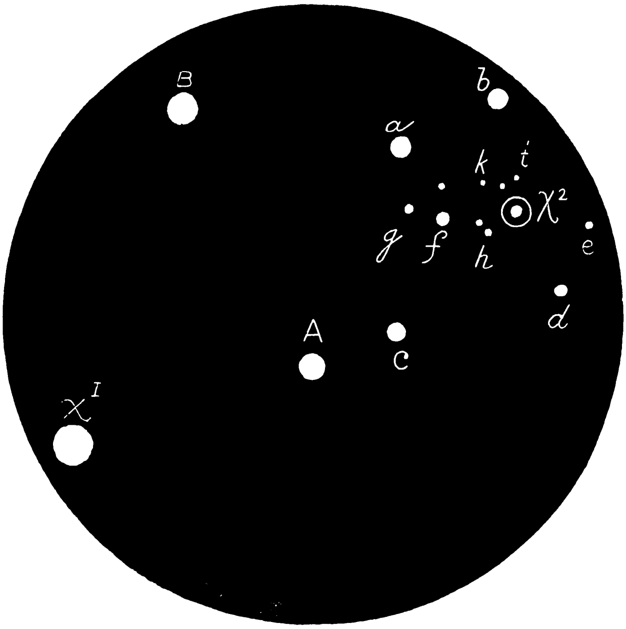
ASTRONOMICAL OBSERVATIONS.

Made by Torvald Köhl, at Odder, Denmark, in the year 1893.

Variable Stars.

Z Cygni.[*]

Jan.	10.	$Z > b$.
	21.	*id.*
Aug.	1.	$Z = a$.
	9.	$Z = b$.
	20.	Z a little $> b$.
Sept.	2.	$Z > b$.
	10.	*id.*
	26.	*id.*
Oct.	2.	$Z = b$.
	10.	*id.*
	13.	$Z = a$.
	23.	*id.*
Nov.	2.	*id.*
	6.	*id.*
Dec.	2.	$Z < c$.
	12.	$Z = e$.



X^2 Cygni.

Jan.	10.	$X^2 = g$.
Sept.	2.	$X^2 = f$.
	10.	*id.*
Oct.	2.	X^2 a little $> a$.
	10.	X^2 almost $= B$.
	13.	$X^2 = B$.
	23.	X^2 almost $= X^1$.
Oct.	30.	*id.*
Nov.	2.	*id.*
	4.	$X^2 > X^1$.
	6.	*id.*
	10.	*id.*
Dec.	2.	X^2 a little $< X^1$.
	12.	$X^1 > X^2 > A$.

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[*] Vide *Publications* A. S. P., No. 22, page 62.

SHOOTING STARS.

No.	Time (P. M.).				Beginning.	End.	Mag.	Note.
		h.	m.	s.	° °	° °		
1	August 9,	10	5	0	25+39	22+31	1	
2	"		7	40	358+10	353+ 4	1	
3	"		10	30	357+34	350+28	3	fast.
4	"		16	20	346+10	339+ 3	2	
5	"		20	40	16+30	10+24	1	train.
6	"		27	10	22+39	16+32	2	
7	"		32	0	302+10	302+ 2	3	
8	"		33	45	355+35	348+28	3	
9	"		36	10	297+59	272+41	♃	id.
10	"		41	40	283+19	270+ 7	1	id.
11	"	11	1	30	34+67	30+72	1	id.
12	"		20	30	314+34	304+26	3	id.
13	"		23	0	29+29	41+31	2	slow.
14	"		24	40	338÷ 6	327÷15	1	train.
15	"		37	10	323+19	313+ 6	3	fast.
16	"		37	30	3+37	14+35	2	
17	"		40	30	16+15	8+ 5	1	
18	"		42	0	322+29	301+20	2	
19	"		44	30	352+18	357+20	3	
20	"		47	50	326+ 6	319÷ 4	♃	train, yellow
21	"		51	40	5+11	5+11	1	stationary.
22	"		57	5	330+55	312+44	1	train.
23	" 10,	9	58	10	58+83	180+84	2	
24	"	10	2	10	319+50	300+34	3	
25	"		4	30	25+67	350+69	2	
26	"		18	0	286+55	282+37	1	id.
27	"		20	0	337÷ 3	331÷ 9	1	
28	"		24	20	273+28	266+10	1	id.
29	"		26	30	337+48	314+22	♃	id., yellow.
30	"		28	20	302+48	287+33	1	
31	"		32	30	3+14	359+ 4	1	
32	"		40	0	310+10	302+ 2	2	
33	"		41	40	324+15	329+ 7	3	

SHOOTING STARS—*Continued.*

No.	Time (P. M.).				Beginning.	End.	Mag.	Note.
		h.	*m.*	*s.*	° °	° °		
34	August 10,		43	40	333+25	324+16	3	
35	"		54	20	10+20	6+14	2	train.
36	"	10	55	30	27+41	20+47	1	train, slow.
37	"		58	0	317+28	308+16	1	train.
38	"	11	0	0	328+ 5	322÷ 3	2	
39	"		5	0	339+48	325+36	2	
40	"		8	0	306÷ 8	299÷15	2	id.
41	"		9	50	345+24	336+10	2	id.
42	"		11	50	312+10	303+ 0	2	id.
43	"		28	10	338+16	334+ 8	1	
44	"		32	0	322+35	314+23	2	
45	"		37	40	333÷ 1	326÷ 9	2	
46	"		40	20	336+36	323+22	3	
47	"		43	40	51+32	53+27	1	
48	"		46	10	345+30	337+21	4	
49	"		49	40	311÷12	307÷17	2	
50	"		51	40	355+61	324+50	1	id.
51	"		53	0	348+41	333+33	3	id.
52	"		58	30	339+62	315+55	1	id.
53	" 11,	10	0	50	356+13	338÷ 8	♀	fireball.
54	"		5	10	307+39	289+24	3	fast.
55	"		14	40	302+17	293+13	1	crossing *Altair.*
56	"		19	0	9+49	2+44	2	train.
57	"		21	50	315+18	310+10	4	
58	"		23	40	320+20	310+ 8	2	id.
59	"		32	19	325÷13	321÷17	1	
60	"		32	30	7+39	356+27	1	id.
61	"		41	0	27+42	24+34	1	id.
62	"		44	30	328+37	315+23	4	
63	"		44	40	300+50	293+35	3	
64	"		59	40	312+24	305+10	3	
65	"	11	10	0	345+53	325+40	2	id.
66	"		14	30	339+ 6	338÷ 5	4	

SHOOTING STARS—*Continued.*

No.	Time (P. M.).				Beginning.	End.	Mag.	Note.
		h.	*m.*	*s.*	° °	° °		
67	August 11,		23	5	347+ 5	339÷ 4	3	
68	"		27	0	21+30	14+15	♃	id.
69	"		29	20	350+42	335+40	2	
70	"		42	0	8+40	2+35	1	id.
71	"	11	47	0	332+34	321+21	2	train.
72	"		50	0	8+40	0+32	2	
73	"		53	30	325÷18	321÷22	♃	
74	"		55	50	301+18	296+ 1	2	id.
75	" 12,	9	58	0	20+66	40+60	3	
76	Nov. 6,	8	38	0	320+30	298+14	1	slow, undulated.

No. 34. This meteor has also been observed at Fredericia, where the end point was fixed : 344°+28° (2d mag., train).

No. 37. Was observed at Fredericia in the position: 354° + 42° ⟶ 1° + 44° (3d mag.).

No. 42. End point observed at Fredericia in the position : 316° + 9° (1st mag., train).

No. 58. Was observed at Copenhagen in the position: 252° + 24° ⟶ 245° + 11° (2d mag.).

No. 60. Was observed at Copenhagen in the position: 255° + 73° ⟶ 230° + 45° (2d mag., orange, train stationary for a moment).

The five meteors named have given the following results :

No.	Beginning.			End.			Real Length of the path.	Observer.
	h	λ	ϕ	h	λ	ϕ	β	
		° ′	° ′		° ′	° ′		
34	. .	. . .	. . .	102	1 30	55 16	. . .	TORVALD KÖHL JOHN PETERSEN
37	74	2 5	55 36	44	2 30	55 36	37	id.
42	. .	. . .	. . .	81	2 29	54 52	. . .	id.
58	110	1 30	55 17	82	1 55	55 8	38	TORVALD KÖHL T. ANDERBERG
60	109	0 22	56 5	74	1 2	55 50	55	id.

⁂ h and β indicate kilometres ; λ is W. Long. from Copenhagen ; ϕ is N. Lat.; h is the altitude of the meteor above the Earth's surface.

Odder is situated in 2° 25′ W. Long. from Copenhagen, and 55° 58′ N. Lat. Fredericia has the geographical position 2° 50′ W. Long. from Copenhagen, and 55° 34′ N. Lat.

On the following dates : January 19 ; March 13, 25 ; April 6, 17 ; May 13 ; July 17 ; September 14, 27 ; October 2, 22, and November 1, fireballs have been observed at different places in Denmark. In my journal, about fireballs, going back to the year 1875, it is to be noticed *that the days 27 and 28 September indicate a period of frequent meteors.*

* * * * * * *

The accompanying* map of Denmark contains sixty projections of meteors seen from various stations in this country. The five above-mentioned calculated meteors are in the map identical with the Nos. 56, 57, 58, 59, 60.

* * * * * * *

The little observatory in the garden of the Real-School at Odder, has been altered in the past year, so that the telescope-room, which formerly stood on the ground, has been lifted three meters, on account of the erection of new buildings in the immediate neighborhood.

LIST OF EARTHQUAKES IN CALIFORNIA FOR THE YEAR 1893.

Compiled by C. D. Perrine.

The following list gives the dates and places of occurrence of earthquakes in California (including also a number outside of the State), compiled from observations at Mount Hamilton, Mills College, Alameda and Carson City (Nev.), and reports received at the Lick Observatory both by letter and newspaper. It is a continuation of such reports printed in Vol. II, page 74; Vol. III, page 247, and Vol. V, page 127, of these *Publications*.

A more complete account will be published as a bulletin by the United States Geological Survey. The dates are civil dates. The times are Pacific Standard (*i. e.*, railroad times.)

Roman numerals enclosed in parenthesis indicate the intensity on the Rossi–Forel scale.

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* It has not been practicable to reproduce this map.